

April 24, 1945.

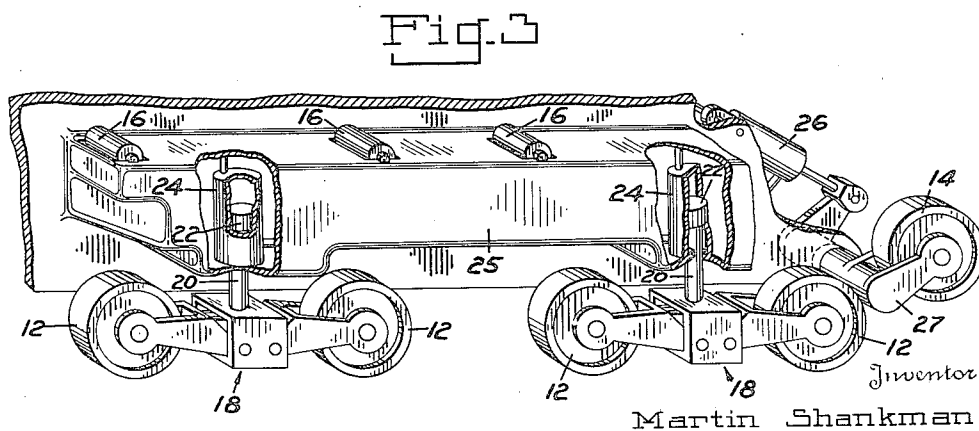
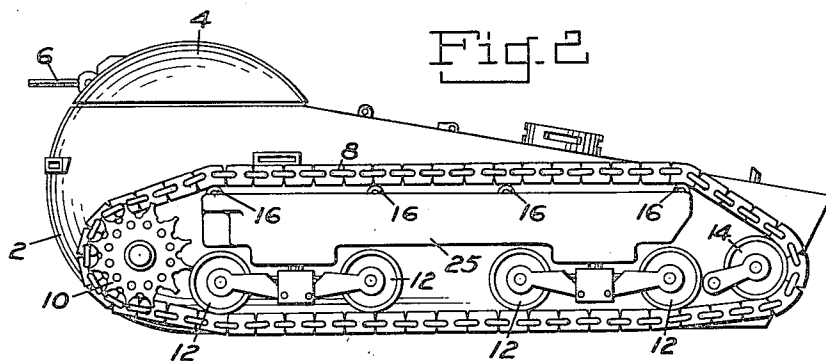
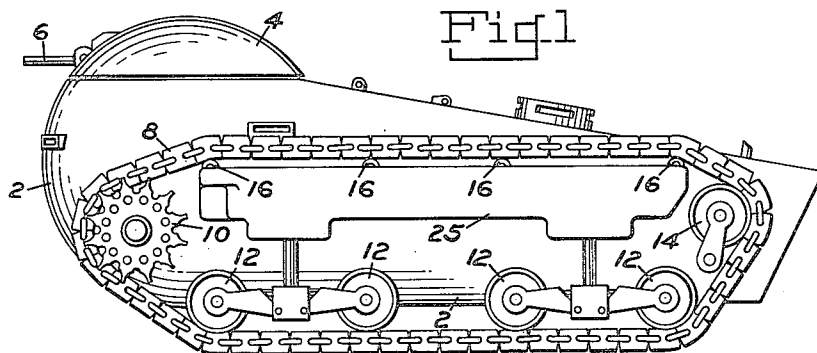
M. SHANKMAN

2,374,240

TANK

Filed Oct. 30, 1942

3 Sheets-Sheet 1



Inventor  
Martin Shankman

334 *L. E. Herstrom + W. E. Theobald*

Attorneys

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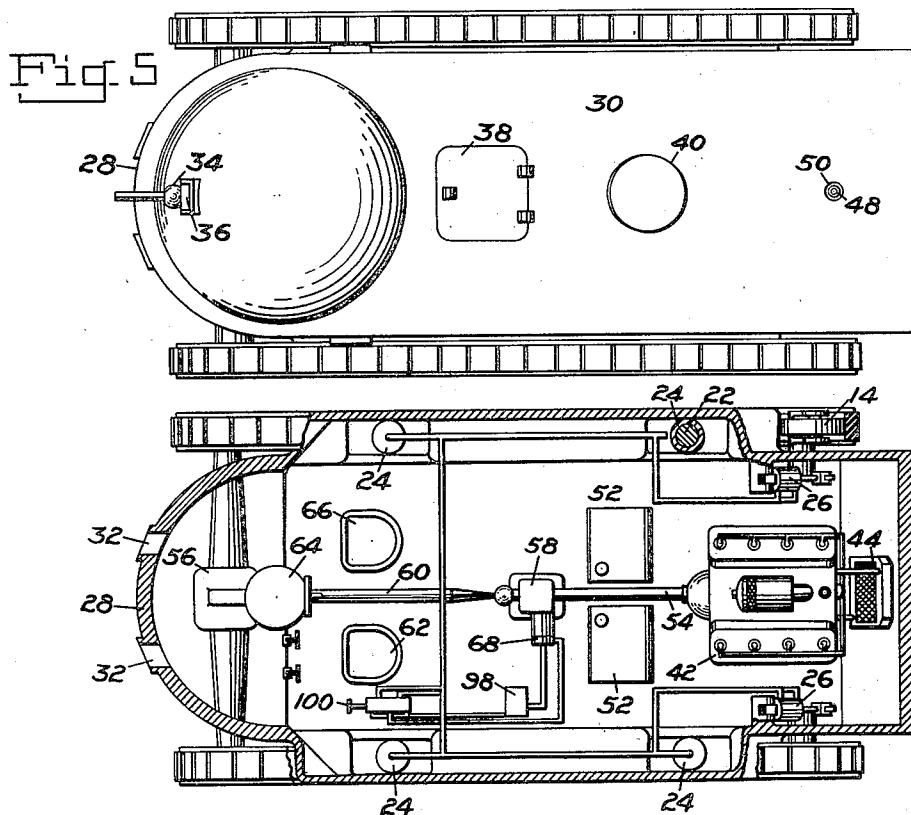
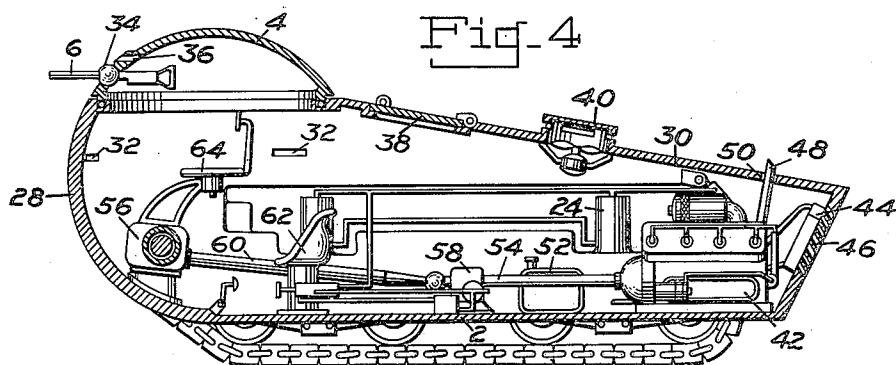
M. SHANKMAN

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3 Sheets-Sheet 2



Inventor

Martin Shankman

334 *C. E. Horstern & W. E. Thibodeau*

Attorneys

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3 Sheets-Sheet 3

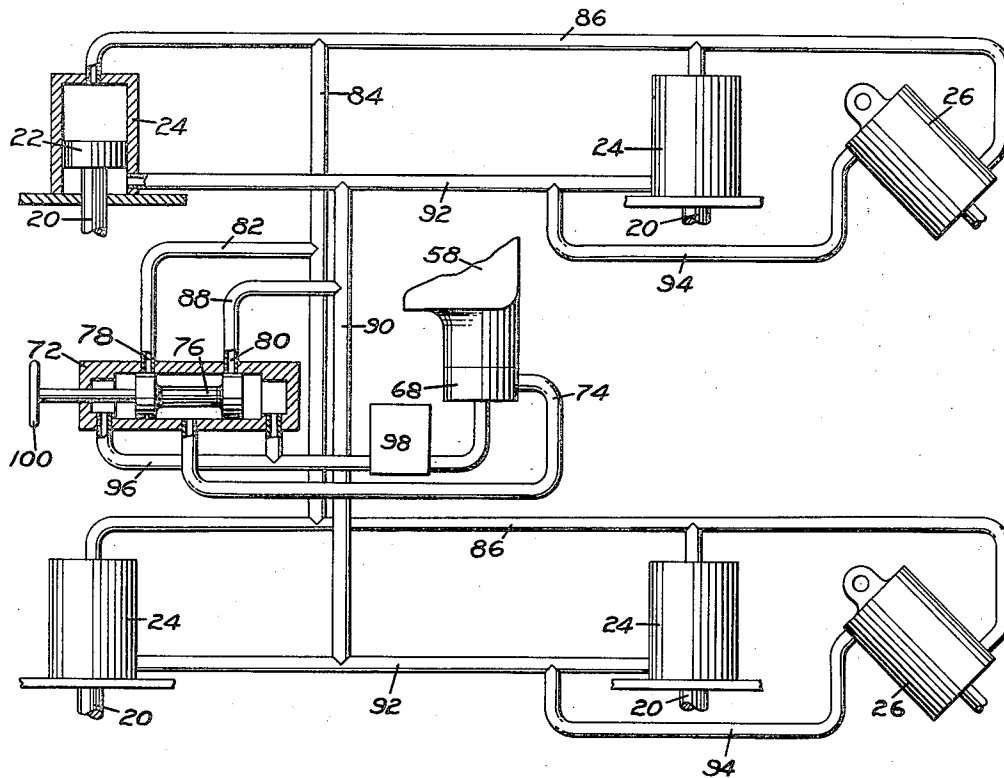


Fig. 7

Inventor  
Martin Shankman

*C. E. Herstern & W. E. Hibbard*

Attorneys

## UNITED STATES PATENT OFFICE

2,374,240

## TANK

Martin Shankman, Huntington, N. Y.

Application October 30, 1942, Serial No. 463,879

6 Claims. (Cl. 180-9.1)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to amphibious tanks, such as would be used by assault troops attempting to establish a beach head.

When assault troops try to establish a beach head, they approach the enemy-held beach in force from surface vessels which come in as close as practicable to the beach. There they disembark in landing boats of some kind and make for shore. Such boats should afford the troops protection against light machine gun and rifle fire, and should permit them to move in fast.

It is the object of this invention to provide an amphibian tank capable of launching from a troop carrier for the approach to an enemy-held beach. The tank is preferably propelled through the water by its track, which can be lengthened for the purpose. The tank carries a turret-mounted machine gun.

The tank is designed to carry a driver and a gunner, and is well adapted for use in squads of twelve to a squad. Weight of a tank would not exceed three tons, and would preferably be held closer to two tons.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Fig. 1 of the drawings is an elevational view of a tank of the invention with its tracks positioned for land travel.

Fig. 2 is a view similar to Fig. 1 showing the tank with its tracks positioned for water travel.

Fig. 3 is a view in perspective of the mechanism to lower and raise the track.

Fig. 4 is a side elevational view of the tank interior, the shell being in section to show the arrangement inside the tank.

Fig. 5 is a top view of the tank.

Fig. 6 is a top view, with the shell in section to show the interior.

Fig. 7 is a detail view of the hydraulic power system used to raise and lower the tank with respect to a portion of the track.

Referring to the drawings in detail, especially to Figs. 1 and 2, a body or hull 2 is shown provided with a turret 4 at its forward end through which a machine gun 6 projects. The tank is carried and propelled by an endless track 8 which runs on a drive sprocket 10, lower idler wheels

12, end wheel 14, and upper idler wheels or rollers 16.

As can better be seen in Fig. 3, lower idler wheels 12 are carried on trucks 18. Each of trucks 18 is mounted on a piston rod 20, on which is mounted a piston 22 which moves in a double acting cylinder 24. Cylinders 24 are mounted in a projecting compartment 25 on the side of the tank. End wheels 14 are moved up and down by the piston, not shown, of cylinder 26 through bell crank 27. Cylinder 26 may be single or double acting. If single acting, the power will be applied to move the wheels downward to take up the slack when lengthening the track for water travel.

Fig. 4 shows the tank interior. As can be seen in this figure and Figs. 5 and 6, the tank body consists of a substantially spherical forward portion 28 made, preferably, of about half-inch armor plate and welded to a generally rectangular portion 30 which is also armor plate but of a thinner section, such as quarter inch material. The portion 28 is provided with vision slits 32. Surmounting the spherical portion and forming a part of it is the turret 4, in which gun 6 is mounted by means of a ball and socket joint indicated generally by 34. A slit 36 in the forward part of the turret provides vision for the gunner. The turret may if desired be made of a thinner section than the rest of the spherical portion.

The rectangular portion 30 of the body has a trap door 38 to permit entering and leaving the tank. A ventilator unit 40 is also provided in the upper surface. Any suitable power plant 42 is mounted in the rear part of the tank. A heat exchanger 44, such as a radiator for an internal combustion engine, may be disposed behind a substantially bullet-proof grille 46. The exhaust pipe 48 can be passed through a small opening 50 in the upper surface of the body. Fuel for engine 42 may be carried in tanks 52. The connections between fuel tanks and engine are not shown, nor are throttle controls and the like, inasmuch as these are conventional and form in themselves no part of this invention.

A drive shaft 54 transmits power to a controlled differential 56 through a power take-off 58 and a shaft 60. Steering may be by means of the controlled differential or by means of track clutches and brakes, not shown, although the controlled differential will be recognized as preferred. Either method is conventional and need not be detailed here.

A driver's seat 62 is shown at the left of the shaft 60, and a gunner's seat 64 is shown as

mounted on the differential 56. A third seat 66 may be provided if desired as an alternate position for the gunner, or for a third crew member, if a three man crew be considered desirable. Or, seat 66 may be omitted to make it possible for the gunner to work from a standing position. In case that is the intention, a platform, not shown, may be provided.

Cylinders 24 and 26 may be supplied with any convenient pressure fluid for movement of idler wheels 12 and 14. This fluid may be supplied by a pump 68 connected to be driven by motor 42 through shaft 54 and power take-off 58. The pump may of course be a conventional pump adapted to the type of fluid used in the system, which may be pneumatic or hydraulic, by way of example. A pneumatic system has the advantage of providing cushioning means in addition to the springing action in trucks 18, and a hydraulic system has the advantage of more positive response.

Various conduits connect the pump 68 to cylinders 24 and 26 through a valve 72. The details of this system are best shown in Fig. 7. A conduit 74 connects the pump discharge with the middle of the valve cylinder, in which is mounted a slide 76 to cover and uncover ports 78 and 80. Port 78 leads to the upper side of pistons 22 in cylinders 24, to the lower side of the pistons in cylinders 26, by means of conduits 82, 84, and 86 as shown. Port 80 leads to the lower face of the pistons in cylinders 24 and to the upper face of the pistons in cylinders 26 through conduits 88, 90, 92, and 94. The ends of the valve cylinder are connected to the pump suction through conduit 96 and a reservoir 98. A handle 100 permits the manipulation of slide 76.

**Operation.**—If the tank is in condition for land travel, and it is desired to prepare it for water travel, handle 100 is pushed inward toward the valve body. Slide 76 thereupon uncovers ports 78 and 80, exposing the lower sides of pistons 22 and the upper faces of the pistons in cylinders 26 to the high pressure side, or discharge, of pump 68 through port 80. The upper ends of cylinders 24 and the lower ends of cylinders 26 are connected to the suction, or low-pressure, side of the pump through port 78. Cylinders 24 raise the idler wheels 12, and cylinders 26 lower the end wheels 14, lengthening the lower portion of the track to the condition shown in Fig. 2. The track will then propel the tank through the water.

If then it is desired to prepare the tank again for land travel, handle 100 is pulled outward from the valve cylinder, uncovering ports 78 and 80 and connecting, through port 78, the upper ends of cylinders 24 and the lower ends of cylinders 26 with the pump discharge; the lower ends of cylinders 24 and the upper ends of cylinders 26 are hereby connected to the pump suction through port 80. The lower portion of the track is thereby lowered with relation to the tank, putting the tank in the condition shown in Fig. 1.

I claim:

1. In a track-laying vehicle, a drive motor, racks driven by said motor, idlers in engagement with the inside of the tracks and operable to raise or lower the vehicle body with relation to the racks, idlers normally above and ahead of the other idlers, and means for lowering the last-mentioned idlers to bring them substantially in line with the other idlers when the vehicle body is lowered relative to the tracks to take up slack in the tracks and incidentally lengthen its traction base.

2. In a track-laying vehicle, a drive motor, a sprocket driven by said motor, a rockably mounted idler spaced from the sprocket and substantially in line therewith, a track around the sprocket and said idler, other idlers in engagement with the inside of the track between the sprocket and the rockable idler, means for raising the intermediate idlers to diminish the distance between the track and the bottom of the vehicle body and incidentally cause slack in the track, and means for rocking the rockable idler to take up the slack and incidentally lengthen the traction base of the track.

3. In an amphibious track-laying vehicle having a substantially water-tight hull, a sprocket at one end of the hull, a drive motor within the hull for driving the sprocket, an idler at the opposite end of the hull and forming an idler of the track, idler wheels between and substantially in line with the sprocket and end idler, means for raising the intermediate idlers with respect to the hull and simultaneously depressing the end idler into engagement with the track to elongate its traction base to condition the vehicle for water travel.

4. An amphibious track-laying vehicle, comprising a drive motor, tracks driven by said motor, a substantially rectangular water-tight hull having a laterally projecting compartment on each side, a cylinder in each end of each compartment, double acting pistons in said cylinder, idlers connected with said pistons below the compartments and constituting suspension means for supporting the vehicle on the tracks, fluid pressure means for reciprocating the pistons in said cylinders to raise and lower the suspension means relative to the vehicle body, and idlers in line with the idlers of the suspension means, a cylinder for each of the last-mentioned idlers, each of said cylinders having a piston connected with said idlers and arranged to move them from one slack take-up position to another, and fluid pressure connections between the idler cylinders and the suspension means cylinders, whereby when the idlers of the suspension means are raised, the other idlers will be depressed to elongate the traction base of the tracks to condition the vehicle for water travel.

5. In an amphibious track-laying vehicle, having a substantially water-tight hull, an elongatable track, a motor driven sprocket outside the hull and at one end thereof, and an idler at the other in line with the sprocket, reciprocable vehicle suspension means between the sprocket and the idler and adapted when extended to support the hull on said track above the ground, means for reciprocating the suspension means to raise or lower the hull with respect to the track and depress the idler when the hull is lowered to elongate the track and incidentally lengthen the traction base thereof and condition the vehicle for water travel.

6. In a track-laying vehicle, a drive motor for the vehicle, a fluid pressure pump driven by the drive motor, vehicle suspension means to support the vehicle on the track, a cylinder, fluid pressure connections between the pump and the cylinder, a double acting piston in the cylinder to raise or lower the suspension means, an idler mounted to take up slack, a fluid operated piston having fluid pressure connections with said double acting piston cylinder to move the idler from one slack take-up position to another.

MARTIN SHANKMAN.